



Research article

Evolution of land system reforms in China: Dynamics of stakeholders and policy transitions toward sustainable farmland use (2004–2019)

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ABSTRACT

China's central government has prioritized land system reforms in rural parts of the country in the past two decades. The transformation of property rights in lands was a significant step for China to pursue the sustainability of farms and permanent food security. The evolution of land system reforms in China involved constant interplay between stakeholders and policy content in terms of policy objectives and instruments, which exhibited various dynamics in different periods. This study adopted a content analysis method to systematically identify the active, passive, and supportive roles of all kinds of stakeholders as well as policy objectives and instruments in the transitional processes of land system reforms in China. We in sum collected 111 policy texts as samples and modeled the relationships of policy keywords. We found Peasants' Households and New Agricultural Business Entities were the most active stakeholders in different periods. Policy objectives are inclined to the stability of legal rights among stakeholders and the scale production of lands, while policy instruments intensively focused on legal regulations with little attention on financial instruments and human resources. We generated two further policy implications, the protection for the exploitation of lands and the involvement of actual operators, based on our findings.

1. Introduction

In the past two decades, China's central government has prioritized land system reforms in rural parts of the country [1]. The transformation of property rights in lands was a significant step for China to pursue the sustainability of farms and permanent food security, which can deeply influence the country's long-term economic and social development [2,3]. The Land Administration Law was first legislated in 1986 and amended for the second time in 2004, providing the legal foundation for the governance of lands. Before the announcement of the Communiqué of the Third Plenary Session of the 18th Central Committee of the Communist Party of China in 2013, China operated the Two Property Rights Separation system, also known as the Household Contract Responsibility System (HCRS), to govern the property of farms. The system divided farmland property rights into two components: the ownership of farmlands belonging to peasants' collective and contract operation rights belonging to peasants' households [4]. The implementation

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of the HCRS unleashed farmers' incentives to produce and resolved free-rider issues which immediately led to an unprecedented acceleration in China's agricultural growth. However, the dividends provided by the HCRS are disappearing since the small-scale land operations limit production and investment limiting the efficiency of agricultural production and land use [1,5]. Meanwhile, over the past few decades, more than 250 million rural people left their land and villages to work and live in the city [6], as a result, large numbers of farmlands were abandoned or rented out which has become a potential national threat to food security. Thus in 2013, the new system called Three Property Rights Separation (TPRS) gradually emerged in official documents from the central government; it was formally adopted by the third amendment of the land administration law in 2019. The new system further divided farmland property rights into three components: *collective ownership* of peasants' collectives, *contractual rights* of peasants' households, and *operation rights* of actual operators of lands, i.e., professional farmers and new agricultural business entities [7,8]. Through institutional changes, operators contracted by peasants' households became the operators physically cultivating farmlands. Fig. 1 presents the detailed institutional transformation.

Previous studies have set up initial discussions toward the evolution of land system reforms in China [9] from the aspects of policy stakeholders or policy objectives and instruments. For stakeholders, their willingness and behavior are the focus of the studies, since "an institution is created by agents all together" [10]. First, farmers are one of the most important participants in rural land use [11], the rural land reform from HCRS to TPRS creates more freedom for farmland transfer [12], which is a rational choice made by farmers in response to economic benefits, information communication, and subjective preferences [13]. Existing literatures have extensively explored the relationship between farmers' willingness and behavior. Several researches proved that peasants' behaviors are influenced directly by their cognitive abilities [14], and farmers' land transfer intention has a positive effect on their land transfer behavior [15]. Whereas other scholars detected evident deviation between intention and behavior, Zhang et al. [16] found that 57.64 % of respondents with intentions to transfer lands had no actual transfer behaviors, such deviation was mainly caused by agricultural production enthusiasm [16]. Furthermore, market-oriented reforms and rapid urbanization brought part of the farmers into part-time, non-agricultural occupations, accelerating the transfer of rural labor to cities and towns [17], which provided the opportunity for the cultivation of other stakeholders such as professional farmers and new agricultural business entities. Cheng et al. [18] also demonstrated that new agricultural business entities that could coordinate with small farmers would improve the economic welfare of farmers' families [18], and factors such as the size of farms and total annual household incomes would affect the willingness of professional farmers to participate in training [19]. According to the previous research, factors such as peasants' differentiation, family and individual farmers' characteristics, recognition of ownership confirmation, rural culture and land transfer policy [13,20–22] can generate effects on stakeholders' willingness and behavior on rural land transfer [21,23,24], green production [25–27], and so on. Compared to traditional farmers, large-scale farmers or operators apply sustainable agricultural production technologies at lower costs and with higher economic efficiency [28], "the farmer with the highest price gets the land" should gradually become the main mechanism for allocating farmland resources [29].

Regarding the farmland system reforms in China, many policy objectives have been discussed such as tenure security, arable land protection, efficient resource utilization, human-land relations coordination [30], increase in farmers' income [31], or promoting a circular and sustainable economy in agriculture [32–34]. The achievement of policy objectives can rely on various policy instruments

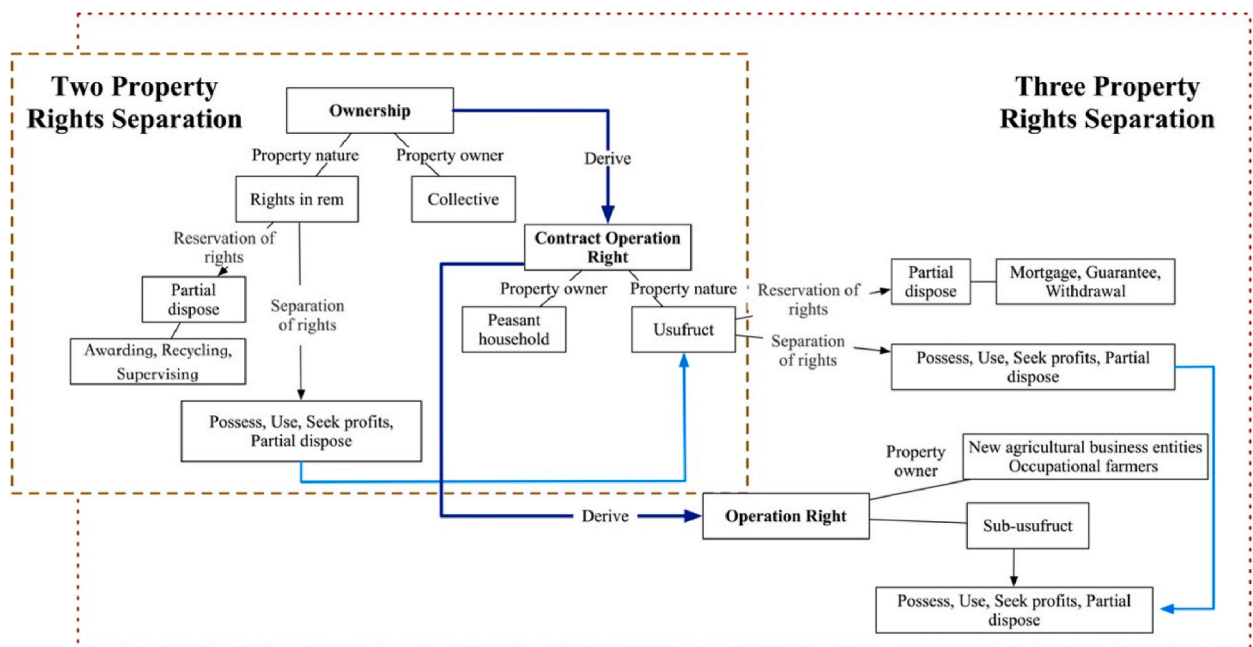


Fig. 1. The property rights structure of Two Property Rights Separation and Three Property Rights Separation.

such as the stability of contracted management rights [35], the heterogeneous market and non-market mechanisms embedded in the divergent regimes in different areas [36], and so on. Among the diversity policy instruments, farmland transfer has received a lot of attention from researchers. The implementation of the policy instrument for land transfer could effectively alleviate land abandonment in mountain regions [37], proven positive influence on agricultural economic growth [38], enhanced the stability of property rights in rural areas and improved the sustainable utilities of farms [39]. Although the positive effects of land transfer are obvious, transfer practices still face problems, several literatures suggests that there are high risks involved in land transfer in China due to its relational society with immature land transfer market and lagging laws [5,39,40], which lead to inefficient farmland transfer market [41], and small-scale land operations remain an issue [40].

In conclusion, these existing studies have analyzed specific stakeholders and sporadic policy objectives and instruments of the farmland reform system in China and proved that substantive policy instruments impact directly on their objectives, by affecting the behavior of stakeholders targeted in policy implementation [42]. However, the interactions of policy stakeholders, objectives, and instruments represent the institutional dynamism and complexities encountered during the reform process. The existing literatures lack of comprehensively portraying the dynamic interplay between stakeholders and policy in the transitional processes of land system reforms in China and comparing such dynamics in different periods. This article filled the gap in existing studies through the systematic investigation of the evolution of land system reforms in China, primarily focusing on the great transformation from HCRS to TPRS systems. Like Sabatier and Mazmanian [43], we considered the transitions of land property rights as complex processes in which stakeholders with divergent interests were embedded in policy networks. The attitudes and statuses of stakeholders actively shaped the implementation of policy content in terms of policy objectives and instruments and were passively shaped by the promotion of this policy content. The interplay between stakeholders and policies would continuously drive policy transitions, which exhibited various dynamics in different periods. This study adopted a content analysis method to (1) identify the active, passive, and supportive roles of all kinds of stakeholders as well as policy objectives and instruments in the transitional processes of land system reforms in China; (2) systematically explore the dynamics characteristics between stakeholders and policy in different periods.

By revealing the interplay between stakeholders and the promotion of policy content, we generated three contributions to the existing research. First, we regard land property rights reform as a complex process in which different policy elements were embedded in policy networks, and provided in-depth insights into the transitional patterns of overall stakeholders and policy content; thus, this study extended the analysis of existing literature that emphasized sporadic stakeholders, and identified policy elements that have been active or inactive during different periods. Second, we can extract the changing characteristics of different policy elements and

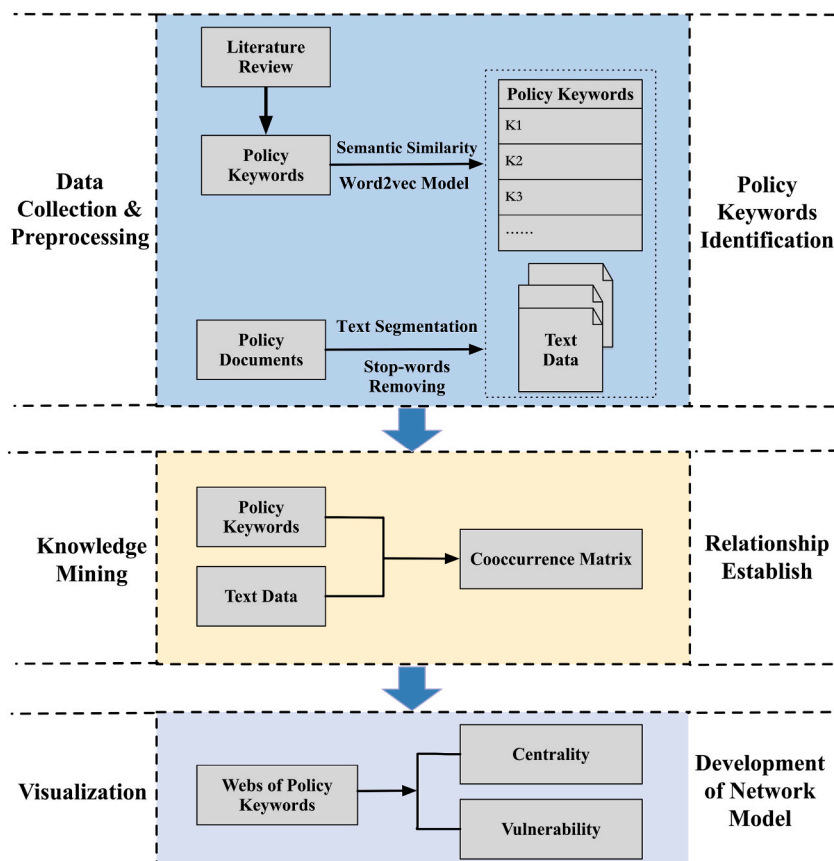


Fig. 2. Research methodology.

Table 1
Sources of keywords.

	Policy keywords	Definition	References	Code
Policy Stakeholders	Peasants' Collectives	Grass-roots economic organizations that take collective property such as land as a link and undertake collective asset management services. They legally represent collective members to exercise collective asset ownership and enjoy independent economic autonomy.	[75,76]	K1
	Villagers' Committees	Groups established under the villagers' committees.	[77]	K2
	Peasants' Households	People who have been engaged in agricultural production for a long time.	[78,79]	K3
	Professional Farmers	A modern agricultural practitioner who takes agriculture as a profession, has corresponding professional skills, and earns most of their income from agricultural production and management, reaching a considerable level.	[80]	K4
	New Agricultural Business Entities	The specialized organizations collectively invested by multiple households or private enterprises which usually involve in the cultivation of large scale lands and standardized agricultural production.	[53,70]	K5
Policy Objectives	Rural Land Ownerships	The right of rural landowners to possess, use, benefit and dispose of the land they own, within the limits of the law.	[9,30]	K6
	Contracted Management Right	The right to possess, use and benefit of collectively owned land within the scope of the law and contracting contract.	[9]	K7
	Land Operation Right	The right of land operators to possess, use and benefit of collectively owned land through land transfer.	[9,54]	K8
	Rural Land Market	The market of buying, selling, and leasing of rural land properties for various purposes	[30,81]	K9
	Moderate Scale Agricultural Operations	Farming systems that are larger than traditional small-scale family farms, which aims to address the challenges of limited farm sizes that reduce mechanization efficiency and increase production costs.	[5,82]	K10
	Agricultural Modernization	The process of improving and advancing agriculture, making it more profitable, competitive, sustainable, and efficient. It involves the use of advanced technology, knowledge, and management practices to increase productivity, reduce costs, and improve the quality of agricultural products.	[83,84]	K11
	Land Contracting Relationship Stable	Maintaining the stability of rural land contracting on a long-term basis.	[30,54]	K12
Policy Instruments	Rural Revitalization	A long-term goal that aims to address the imbalance between urban and rural development, consolidate poverty-eradication achievements, and reduce vulnerabilities in China.	[30,85]	K13
	Farmers' Income	An overview of farmer incomes.	[31,86,87]	K14
	Collectively Owned Land Contracted Out	Contracted out the usage rights of collectively owned land to farmers.	[88]	K15
	Rural Land Stock Cooperative	A land cooperative management system in which farmers are distributed with profit from land contract operation right according to shares.	[9,89]	K16
	Land Reallocation	Villages to reallocate farmland due to the changes of social, economic, demographic, and natural endowment composition.	[8,90,91]	K17
	Extension of Rural Land Contract Period	Prolong rural land contracts before the they expire.	[92]	K18
	Rural Land Mortgage Loan	The farmers to get credit funds by using their owned land right property, so that land and capital can be freely converted.	[62,93]	K19
	Land Registration and Certification	The process of registering and certifying property rights of land.	[1,39,94,95]	K20
	Farmland Inheritance	The behavior of citizens obtaining the farmland use rights enjoyed by the deceased during his lifetime in accordance with legal provisions or a legally effective will.	[93,95]	K21
	Land Transfer	Farmers who have farmland Contracted Management Rights transfer land use rights to others.	[54,96,97]	K22
	Land Transfer Contract	A legal document that transfers operation right of farmland from one party to another. The agreement outlines the terms and conditions of the transfer, including the price, timing, and method of transfer.	[5,98,99]	K23
	Farmland Legal System	The set of laws, systems of farmland and how they are enforced.	[54,95,98]	K24
	Rural Land Financing	Financing system around the development, production and operation of agricultural land.	[100]	K25
	Rural Land Withdrawal Mechanism	During the contracted period, the contractor can voluntarily return the contracted land to the collective.	[93]	K26
	Protection of Arable Land	Protection of the quantity and quality of arable land by using legal, administrative, economic, technical and other measures.	[30,101,102]	K27
	Social Security System	Measures taken by society to provide material assistance to ensure the basic livelihood and welfare of its members.	[1,9,81]	K28
	Rural Land Conflicts and Disputes	The dispute arises from the ownership and use rights of the farmland as well as other related land rights.	[94,103]	K29
	Rural Labor Migration	Labor migrates out or migrates in the rural.	[104–106]	K30
	Risk Prevention	Identify related risks as they arise, and take proactive steps to address them before they become major issues.	[93,107]	K31
	Agricultural Subsidies	Government transfers payments for agricultural production, distribution and trade.	[108]	K32

thoroughly portray the complex processes of land system reforms in China by comparing different periods. Furthermore, this study compared the precise interplay of stakeholders and policy contents with the ideal policy promotions suggested by existing literature. This study’s findings present the practical problems of policy implementation and generate concrete policy implications for the governments of China and other countries intending to reform land systems for sustainable farmland uses.

This article was structured as follows. Section 2 details our data and methodology, and Section 3 presents the results and highlights the critical changes in stakeholders and policy content. Section 4 discusses our findings, and Section 5 presents the conclusions.

2. Methodology

This article adopted content analysis as the primary research method. We followed Elo and Kyngas [44] that content analysis was a proper research method to describe an empirical phenomenon conceptually [44]. Since this article investigated the empirical dynamics of the evolution of land system reforms in China, we considered content analysis a suitable research method for this study. To strengthen the trustworthiness of this study, based on the analysis of Elo et al. [45] and Sandström and Carlsson [45,46,46], we adopted three steps to operate the research method: collecting data, identifying policy keywords, and modeling the webs of policy keywords. Fig. 2 illustrates the complete operation of the methodology.

2.1. Step 1: Collection of data

The data were collected through three rounds: in the first round, we constructed a series of search terms to collect policy documents about HCRS and TPRS separately through the PKULAW Database (<https://www.pkulaw.com/>). The PKULAW Database is a continuously updated full-text database of Chinese public policies promulgated in mainland China since 1949 [47], and recent studies have demonstrated the comprehensive and reproducible of the database [48,49]. In this way, selection bias can be avoided when using archival records from preidentified core governing bodies [50]. According to our research objectives, first, we use five Chinese terms – “Household Contract Responsibility System”, or “Two Property Rights Separation”, or “Contracted Management Right”, or “Rural Land Property Rights”, or “Land Transfer” in running full-text searches of national policy documents archived in the PKULAW policy database, while limiting the policy issued time during 2004–2012. Then we use four Chinese terms – “Three Property Rights Separation”, or “Land Operation Right” or “Rural Land Property Rights”, or “Land Transfer” in running full-text searches of national policy documents archived in the PKULAW policy database, while limiting the policy issued time during 2013–2019. Accordingly, we obtained our original dataset, including notifications, schemes, implementation plans, laws and regulations, as well as other documents reflecting government policies. In the second round, the official government websites such as the National People’s Congress, the State Council, and the ministries subordinate to the State Council, including the Ministry of Agriculture and the Ministry of Ecology and Environment were used as supplementary databases for data validation, ensuring that the samples covered all relevant policies. In the last round, the resulting documents were manually screened by research team members, we removed some texts that were not relevant to the research topic and documents that duplicated collections. Eventually, 147 policy texts from 2004–2019 were collected as samples in this article. Among these samples, 111 samples related to the HCRS were issued during 2004–2012, and 36 samples of the TPRS system were issued during 2013–2019 (as shown in Appendix A and Appendix B).

2.2. Step 2: Identification of policy keywords

The policy keywords were identified through two rounds. We recognized original policy keywords in the first round through an extensive literature review (Fig. 2). Based on the policy studies of Mayntz [43] and Howlett (2009), we divided these policy keywords into three categories: stakeholders, policy objectives, and policy instruments. Each category contained several subordinate policy keywords suggested by existing literature regarding the land system reforms in China (as shown in Table 1). In the second round, to increase the reliability of policy keywords, we invited five experts to revise the policy keywords and removed keywords unrelated to the theme of this research through a focus group approach. During the revision stage, experts were asked to revise the identified policy keywords’ database and remove the keywords that were unrelated to the farmland system reform in China. The experts’ opinions were collected according to the following principle: if more than one expert disagreed on the keywords, there will be further discussion to revise, remove, or add some other keywords, until at most one expert does not agree with the results. Following these revisions, only 32 policy keywords were retained. Table 1 shows the 32 keywords and their sources embedded in the existing literature. All keywords were numerically coded with K* rules to facilitate the differentiation. For example, K1 represented the first policy keyword identified

Table 2
Models and equations for the calculations of the webs of policy keywords.

Types of equation	Serial number of equation	Formulas of equation
Degree Centrality	1	$Out\ deg\ ree_i = \sum_{i \in G} x_{ij}$
	2	$In\ deg\ ree_i = \sum_{i \in G} x_{ji}$
Betweenness Centrality	3	$Betweenness_i = \sum_{j,k \in G} \sigma_{jk}(i) / \sigma_{jk}$

Note: G was the set of keywords. i,j,k referred to the numeral codes of policy keywords from 1 to 32. X referred to the sum of edges. $\sigma_{jk}(i)$ meant the probability that Ki was on the shortest edge between keywords K j and K k.

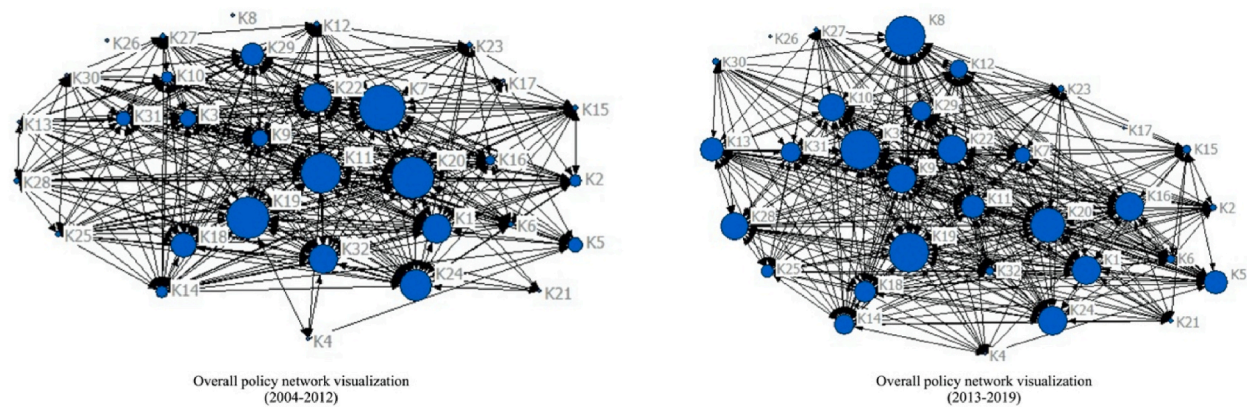


Fig. 3. Webs of policy keywords in the two periods (2004–2019).

Table 3
Degree and Betweenness Centralities of 10 greatest policy keywords (2004–2012).

Keywords	OutDegree	Keywords	InDegree	Keywords	Betweenness
Land Reallocation (K17)	6.000	Land Transfer (K22)	6.841	Contracted Management Right (K7)	13.768
Land Transfer Contract (K23)	5.000	Contracted Management Right (K7)	6.578	Land Registration and Certification (K20)	12.564
Land Contracting Relationship Stable (K12)	4.553	Rural Land Market (K9)	6.572	Rural Land Mortgage Loan (K19)	12.119
Rural Land Ownership (K6)	4.075	Land Registration and Certification (K20)	5.565	Agricultural Modernization (K11)	11.974
Moderate Scale Agricultural Operations (K10)	4.045	Peasants' Collectives (K1)	5.425	Farmland Legal System (K24)	9.102
Contracted Management Right (K7)	3.930	Risk Prevention (K31)	5.343	Peasants' Collectives (K1)	8.435
Land Transfer (K22)	3.927	Peasants' Households (K3)	4.911	Land Transfer (K22)	8.435
Rural Land Financing (K25)	3.667	Farmland Legal System (K24)	4.754	Agricultural Subsidies (K32)	7.986
Rural Land Stock Cooperative (K16)	3.640	Agricultural Modernization (K11)	4.403	Extension of Rural Land Contract Period (K18)	6.841
Peasants' Households (K3)	3.159	Rural Land Conflicts and Disputes (K29)	3.808	Rural Land Conflicts and Disputes (K29)	5.905

Table 4
Degree and Betweenness Centralities of 10 greatest policy keywords (2013–2019).

Keywords	Out Degree	Keywords	InDegree	Keywords	Betweenness
Rural Land Stock Cooperative (K16)	5.765	Land Transfer (K22)	8.064	Peasants' Households (K3)	5.527
Land Transfer Contract (K23)	5.267	Peasants' Households (K3)	8.005	Land Operation Right (K8)	5.527
Land Contracting Relationship Stable (K12)	5.209	Peasants' Collectives (K1)	7.292	Rural Land Mortgage Loan (K19)	5.527
New Agricultural Business Entities (K5)	4.960	Rural Land Mortgage Loan (K19)	5.929	Land Registration and Certification (K20)	4.642
Moderate Scale Agricultural Operations (K10)	4.714	Rural Land Market (K9)	5.895	Peasants' Collectives (K1)	4.002
Rural Land Conflicts and Disputes (K29)	4.500	Land Registration and Certification (K20)	5.796	Land Transfer (K22)	4.002
Rural Labor Migration (K30)	4.500	Land Operation Right (K8)	5.674	Rural Land Stock Cooperative (K16)	3.816
Land Operation Right (K8)	4.415	Risk Prevention (K31)	5.429	Rural Land Market (K9)	3.787
Rural Land Ownership (K6)	4.407	Agricultural Modernization (K11)	4.750	Farmland Legal System (K24)	3.772
Land Transfer (K22)	4.307	Moderate Scale Agricultural Operations (K10)	3.930	Moderate Scale Agricultural Operations (K10)	3.707

through a literature review.

2.3. Step 3: Modeling the relationships between policy keywords

We modeled the relationships of policy keywords based on the equations established by Rebecca et al. (2014); Degree Centrality

and Betweenness Centrality were measured among these keywords. Degree Centrality included both Outdegree and Indegree centralities. Outdegree centrality referred to the sum of edges going out from a keyword, revealing the active influence of this keyword on the other; Indegree centrality referred to the sum of edges received by a keyword and showed the extent that others passively influenced this keyword. Moreover, Betweenness Centrality was the number of a particular keyword existing in the shortest edges of the other two keywords. The higher the Betweenness Centrality of a keyword, the more critical it acts as a central hub for the other two keywords to pass it and link. Table 2 presents the detailed equations of Degree Centrality and Betweenness Centrality.

3. The dynamic transitions of land system reforms in China

This section compares the dynamics of land system reforms in China in different periods. The policy evolution from 2004 to 2019 was divided into 2004–2012 and 2013–2019. As mentioned in Section 1, 2004 was the year of the second amendment of the Land Administration Law. The year 2013 was when the TPRS System was issued for the first time, and the Land Administration Law was amended for the third time in 2019. We virtualized the webs of policy keywords in the two periods in Fig. 3. Tables 3 and 4 listed the keywords' Degree and Betweenness centralities in the two periods.

3.1. Policy stakeholders: the emergence of actual operators

Policy stakeholders included conventional actors embedded in the land systems through the two periods and the new actors who only emerged in the second period. Peasants' Households and Collectives represented the conventional long-term actors who played active and passive roles in land system reforms. New Agricultural Business Entities and Professional Farmers were the typical new actors who initially began to be involved in the land systems in 2013.

Peasants' Households (K3) and Peasants' Collectives (K1) have been essential stakeholders in the land system reforms from 2004 to 2019. Table 3 indicates that Peasants' Households were ranked among the top 10-Degree Centrality, with an Outdegree of 3.159 and an Indegree of 4.911 in the first period. Peasants' Households, in other words, not only actively influenced the promotion of policy objectives and policy instruments in the HCRS framework but were also passively influenced by the promotion of policies; however, the roles of Peasants' Households changed in the second period. Table 4 shows that Peasants' Households remained at the Indegree of 8.005 and the Betweenness Centrality of 5.527; however, the Outdegree of Peasants' Households was not even ranked among the top ten. Peasants' Households became passive and merely supported the implementation of policy objectives and instruments rather than actively influencing the promotion of the TPRS system. Moreover, Peasants' Collectives were another main stakeholder in the web of policy keywords. Tables 3 and 4 show that the Indegree of Peasants' Collectives was 5.425 in the first period and 7.292 in the second. The Betweenness of the Peasants' Collectives was 8.435 in the first and 4.002 in the second periods. The Outdegree of Peasants' Collectives was not ranked among the top ten through the two periods. Peasants' Collectives were deeply influenced and only supported the implementation of policy objectives and instruments. Peasants' Collectives, the owners of farmlands, played no active roles in the transitional processes from HCRS to TPRS systems.

New Agricultural Business Entities (K5) and Professional Farmers (K4) were the actual operators of lands that emerged in the second period of the TPRS system. New Agricultural Business Entities were the specialized organizations collectively invested by multiple households or private enterprises [18,51]. These new entities usually cultivate large-scale lands and standardized agricultural production [52]. Compared with Peasants' Households, these new agricultural business entities possessed relatively higher technological capabilities and relatively matured management [18,53]. Table 4 shows that the Outdegree of New Agricultural Business Entities was 4.960 and showed the active roles of the New Agricultural Business Entities in implementing policy in the second period. Furthermore, Professional Farmers (K4) were modern agricultural workers earning income mainly from agricultural production. Professional Farmers were relatively knowledgeable and well-versed in the latest agricultural management techniques [19] compared with Peasants' Households; however, even in the second period, both the Degree Centrality and Betweenness Centrality of Professional Farmers did not rank in the top ten. Professional Farmers indeed played minor roles in the implementation of land system reform policies.

In short, the dynamics of stakeholders changed in the processes of land system reform from 2004 to 2019. Peasants' Households, who were essential stakeholders, only played active roles in the first period and became passive and supportive in the policy implementations of the TPRS system. Peasants' Collectives owned land but remained passive through the two periods of the transformation processes. New Agricultural Business Entities emerged as active stakeholders in implementing policy objectives and instruments. Professional Farmers as actual operators of lands in the TPRS system, however, did not play significant roles in policy implementation.

3.2. Policy objectives: Continuity and diversities

Policy objectives contained several interrelated purposes, which were achieved in turn. Land Contracting Relationship Stable, Contracted Management Right, Land Operation Right, and Rural Land Market were the four interrelated objectives promoted to establish a market mechanism that facilitated land transfers in the rural areas without transferring the ownership of peasants' collectives. Moderate-scale Agricultural Operations and Agriculture Modernization were also interrelated objectives to improve land-scale production and alleviate intensive farming. These policy objectives together pursued the vision of sustainable farmland uses and contributions to food security in the long-term.

Contracted Management Rights (K7) and Land Contracting Relationship Stable (K12) were targeted earlier than Land Operation Right (K8) and Rural Land Market (K9). Land Contracting Relationship Stable which possessed the Outdegree of 4.553 and 5.209 in the

two periods conteneously guided the legal stability of land transfer through the transformation processes. The Contracted Management Right, which belonged to the Peasants' Collectives, was delivered by the Collectives, the owners of lands, to Professional Farmers and New Agricultural Business Entities. As Peasants' Collectives did not engage in agricultural operations, the establishment of the Contracted Management Right authorized Peasants' Collectives to legally contract with Professional Farmers and New Agricultural Business Entities to outsource the actual management of farmlands [54]. With the Contracted Management Right, Peasants' Collectives that outsourced the actual management also retained the rights to recycle the signed contracts if the contracted lands were exploited [55]. Table 3 shows that the objective of the Contracted Management Right possessed an Outdegree of 3.93, an Indegree of 6.578, and a Betweenness Centrality of 13.768 in the first period. This policy objective, in practice, actively shaped the legal relationships among stakeholders and policy instruments and simultaneously relied on the involvement of stakeholders and policy instruments to achieve its purpose. With high Betweenness Centrality, the objective of Contracted Management Right also played an important middle role in linking stakeholders with the promotion of particular policy instruments; however, once the Contracted Management Right was established in the first period, it was no longer prioritized. The Degree Centrality and Betweenness Centrality of the objective did not even rank in the top ten in the second period. Indeed, Land Operation Right (K8) and Rural Land Market (K9) were prioritized in the second period after the Contracted Management Right was established. The Land Operation Right belonging to the Professional Farmers and New Agricultural Business Entities held an Outdegree of 4.415, an Indegree of 5.674, and a Betweenness of 5.527 (as shown in Table 4). The objective actively shaped the legal relationships among stakeholders and policy instruments and passively influenced the stakeholders' participation and the policy instruments' utility. As Peasants' Collectives contracted more and more Professional Farmers and New Agricultural Business Entities to operate the cultivation in lands, the objective of the Land Operation Right was emphasized to protect the legal rights of Professional Farmers and New Agricultural Business Entities and avoid disputes among stakeholders [39]. Moreover, the Rural Land Market, which pursued the development of the rural farmland markets without formal privatization [56], had an Indegree of 5.895 and a Betweenness Centrality of 3.787 (as shown in Table 4). The objective supported the linkages among stakeholders and policy instruments, and its achievement passively relied on other stakeholders, objectives, and instruments. The Rural Land Market gradually formulated with the construction of the Contracted Management Right and Land Operation Right. Farmlands gradually were not considered as a security mechanism to guarantee the basic livelihood of farmers but transformed into a market mechanism that pursued the expansion of economic outputs of lands [54].

Moderate-scale Agricultural Operations (K10) and Agricultural Modernization (K11) were another two interrelated policy objectives that were constantly important through the first and second periods. Moderate-scale Agricultural Operations possessed an Outdegree of 4.045 in the first period, an Outdegree of 4.714, an Indegree of 3.93, and a Betweenness Centrality of 3.707 in the second period (as shown in Table 4). While the objective actively guided the stakeholders and implementation of instruments to achieve its

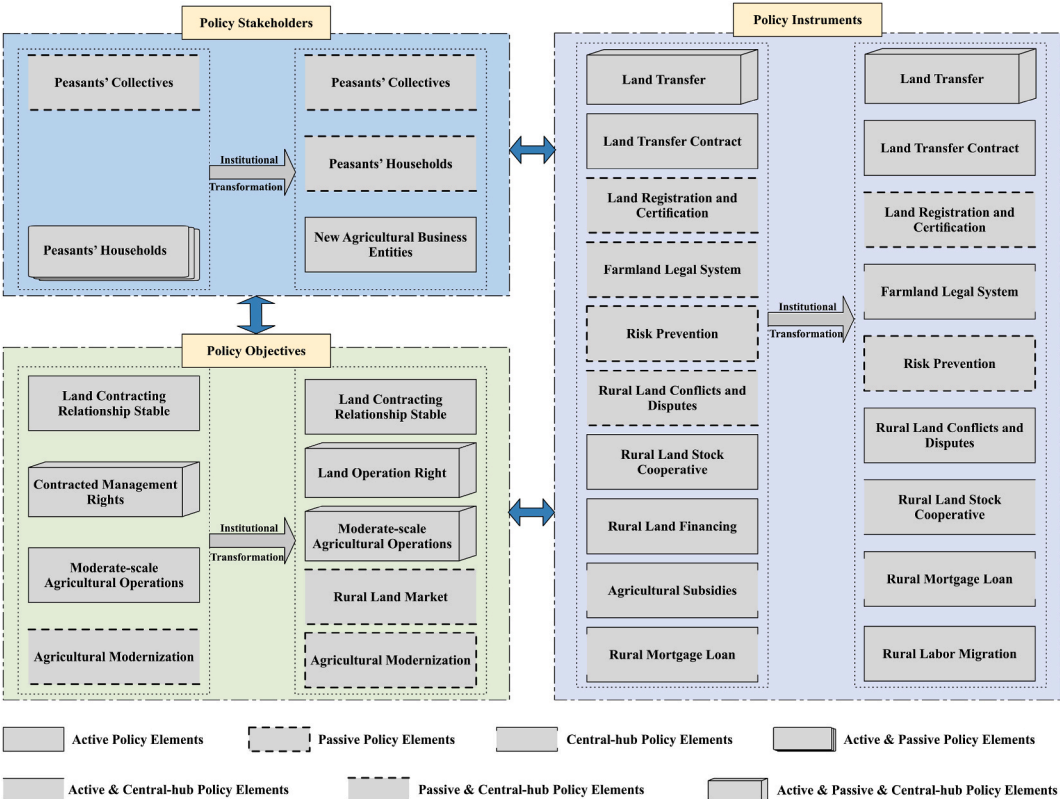


Fig. 4. The evolution of different roles of policy elements.

purposes in the first period, its achievements were further influenced by the promotion of other policy instruments and the participation of stakeholders. Since small-scale land operations limited food production and investments in agricultural lands [1,5], the government intensively expanded the scale production of farmlands through the transformation from HCRS to TPRS systems. In addition, Agricultural Modernization has been the objective passively influenced by stakeholders and instruments. The policy objective possessed an Indegree of 4.403 and Betweenness Centrality of 11.974 in the first period, and its Indegree was 4.75 in the second period. The achievement of Agricultural Modernization strongly relied on the support of stakeholders and the implementation of other policy instruments.

In short, the main policy objectives in the processes of land system reforms were interrelated and revealed both continuity and diversities. The objectives of Contracted Management Right, Land Operation Right and Moderate-scale Agricultural Operations played active roles in guiding the relationships between stakeholders and promoting policy instruments. In contrast, the Rural Land Market and Agriculture Modernization intensively relied on other stakeholders and policy instruments to achieve their purposes. Different policy objectives were achieved through different dynamics among stakeholders and policy instruments.

3.3. Policy instruments: diversity in transitions

Various policy instruments were promoted in the transitional processes from HCRS to TPRS systems. Among these policy instruments, six instruments, i.e. Land Registration and Certification (K20), Land Transfer (K22), Land Transfer Contract (K23), Farmland Legal System (K24), Rural Land Conflicts and Disputes (K29), Risk Prevention (K31), were the interrelated instruments governing the detailed implementation of laws and rules. Four policy instruments, i.e., Rural Land Stock Cooperative (K16), Rural Land Mortgage Loan (K19), Rural Land Financing (K25), and Agricultural Subsidies (K32), were also complementary with each other to build up the financial systems in rural areas. Rural Labor Migration (K30) was an important instrument for managing human resources in rural areas. We first discuss the implementation of instruments regarding legal systems and, afterward, the instruments related to finance and human resources.

Several policy instruments were launched to rule the legal relationships among stakeholders. Land Transfer (K22) and Land Transfer Contract (K23) were active policy instruments in the first and second periods. Land Transfer possessed an Outdegree of 3.927, an Indegree of 6.841, and a Betweenness Centrality of 8.435 in the first period. The instrument also held an Outdegree of 4.307, an Indegree of 8.064, and a Betweenness Centrality of 4.002 in the second period (shown in Table 4). Land Transfer influenced and supported the behaviors of other stakeholders and the achievement of policy objectives, and its implementation was also passively influenced by the behaviors of stakeholders and changes in policy objectives. Furthermore, the Land Transfer Contract held the Outdegree of 5 and 5.267 in the first and second periods. Both instruments have played active roles in the legal relationships between Peasants' Households and actual operators of lands, Professional Farmers, and New Agricultural Business Entities. Since the HCRS, some Peasants' Households have already outsourced the actual cultivation operation to Professional Farmers and New Agricultural Business Entities for a limited contractual time [57]. The Land Transfer and Land Transfer Contract instruments actively guided detailed rural relations between different stakeholders [58] and thus facilitated steady land transfers from small households to sizable agricultural business entities for long-term investments. Compared with the Land Transfer and Land Transfer Contract, the instruments of Land Registration and Certification (K20), Farmland Legal System (K24), Rural Land Conflicts and Disputes (K29), and Risk Prevention (K31) were relatively passive and supportive. While Land Registration and Certification showed only an Indegree and a Betweenness Centrality (Indegree of 5.565 and 5.796 and Betweenness of 12.564 and 4.642) in the two periods, Farmland Legal System revealed an Indegree and a Betweenness Centrality (Indegree of 4.754 and Betweenness of 9.102) in the first period, and only Betweenness Centrality (3.772) in the second period. Risk Prevention (5.343 and 5.429) displayed an Indegree centrality in the top 10 rankings (as shown in Tables 3 and 4). Only Rural Land Conflicts and Disputes, which showed Indegree (3.808) and Betweenness Centrality (5.905) in the first period, turned to reveal an Outdegree (4.5) in the second period. As previous license transactions in rural villages intensely relied on irregular or oral contracts, which led to disputes among stakeholders [39], the establishment of the Farmland Legal System and Land Registration and Certification supported to prevent risks and reduced conflicts of rural lands.

Multiple financial instruments were launched to ensure the benefit of different stakeholders. The instruments of Rural Land Stock Cooperative (K16), Rural Land Financing (K25), and Agricultural Subsidies (K32) were used to support Peasants' Households. The Rural Land Stock Cooperative possessed an Outdegree of 3.640 in the first period, an Outdegree of 5.765, and a Betweenness of 3.816 in the second period (shown in Tables 3 and 4). The instrument encouraged Peasants' Households to transfer their contract operation rights under the HCRS to be stocked in the Peasants' Collectives under the TPRS system. Once the Professional Farmers or New Agricultural Business Entities rented farmlands from Peasants' Collectives, the Peasants' Collectives could allocate these equities to small households based on their stocks in the collectives. Rural Land Financing with an Outdegree of 3.667 and Agricultural Subsidies with a Betweenness Centrality of 7.986 also subsidized the income of Peasants' Households in the first period; however, even though the two policy instruments once played active and supportive roles in influencing the behaviors of stakeholders and achievement of policy objectives. Their importance faded out in the second period. Furthermore, a Rural Mortgage Loan (K19) was an instrument aimed at solving the financial problem of Professional Farmers and New Agricultural Business Entities to raise farmland investments [59] and to improve farm performance [60]. The instrument had a Betweenness of 12.119 and 5.527 in the first and second periods. In the HCRS, as Professional Farmers and New Agricultural Business Entities could not be formally licensed by Peasants' Collectives to cultivate lands, they did not possess official mortgages to debt from banks for land investments [61]. With the transition to the TPRS system, Professional Farmers and New Business Entities could pay a debt by using their Land Operation Rights as mortgages [62] and thus activated capital investments in rural lands [63].

Rural Labor Migration (K30) was a new policy instrument to manage human resources with an Outdegree of 4.5 in the second

period. While young and educated rural laborers usually preferred to work in cities, elderly rural laborers who once worked in cities also preferred to move back to rural areas [64]. Thus, Rural Labor Migration was implemented to provide opportunities for rural laborers born in peasants' households and laborers born in cities to switch between cities and rural areas [65]. On the one hand, the elderly rural laborers who have gradually lost their ability to work in cities could return to their hometowns and either choose to directly engage in food production or license their farmlands to professional farmers or new agricultural business entities. On the other hand, young and middle-aged laborers in cities with higher labor skills could also move to rural areas and engage in agricultural production as professional farmers. The efficiency of agricultural production could be stimulated through the exchange of labor flows between cities and rural areas [66].

In short, policy instruments showed divergent evolutionary trajectories in the transitions of land system reform. Land Transfer and Land Transfer Contracts played active roles in guiding the transformation of legal relationships between different stakeholders, and the Rural Land Stock Cooperative supported the financial benefits of Peasants' Households over the two periods. Moreover, rural labor migration, which only emerged in the second period, actively guided the mechanism to facilitate the labor exchanges between cities and rural areas; however, the legal instruments, such as Land Registration and Certification, Farmland Legal System, and Risk Prevention, only played passive and supportive roles in the transitional processes. Furthermore, the financial instrument of Rural Mortgage Loans, which protected the interests of Professional Farmers and New Agricultural Business Entities, was also supportive in webs of policy keywords. The evolution of different roles of policy elements are shown in Fig. 4.

4. Discussion

This article systematically investigated the dynamics of stakeholders and policy content in terms of policy objectives and instruments in the transitional processes from HCRS to TPRS systems. Through establishing the webs of policy keywords by the content analysis method, we found that different stakeholders indeed played divergent roles, either positive, negative, or supportive, in shaping the implementation of policy content. The transitions of policy objectives and instruments also showed various trajectories, which generated different influences on the status of stakeholders. In this section, we further compare our findings regarding stakeholders, policy objectives, and instruments with existing literature and afterward recommend several policy implications based on our results.

4.1. The dynamic changes of stakeholders

The dynamics of stakeholders changed with the implementation of policies in different periods. Peasants' Households were the most active stakeholders in the first period, and the New Agricultural Business Entities played active roles in shaping policy implementation in the second period. The active stakeholders' switch showed that actual land operators transitioned from the HCRS to the TPRS systems. Even though the Peasants' Collectives remained as the owners of lands during the institutional change, their roles stayed passive through the two periods since Rural Land Ownership was not as important as Contracted Management Right and Land Operation Right. The reasons for the low level of policy responsiveness to ownership were that on one hand, moderately ambiguous was a feature of rural land ownership right since the right was assigned to the 'rural collective', which had multiple agents (such as the villagers' committee, the village economic cooperative, or the township collective economic entity) in practice. On the other hand, the collective was left with only the right to award land contracts and the right to supervise farmland since the abolishment of the agriculture tax in 2006. Therefore, the vacated collective ownership was only capable of managing, awarding, and recycling the contractual right, and not engaging in specific agricultural operations. However, the vacated collective ownership limited the exercise of ownership disposition function, which hindered the collective from managing irrational farmland use (i.e., farmland abandonment) in practice through regulatory measures such as recycling, and may lead to 'rural collective property' becoming 'rural local government property' [55]. The collective ownership cannot be changed, and the policy objective of establishing contract management right was achieved with the implementation of the HCRS policy, the key to institutional innovation is to revitalize farmland management right [54]. However, policies still need further improvement to deal with problems arising from the separation of operational right, for instance, large-scale agricultural business entities might eliminate irregularities in the landscape to conduct mechanized production after transfer in the farmland, yet for the farmers who transfer land out, the removal of such flat ridges may be equivalent to eliminating the boundaries of their land, which increases the difficulty in recovering their land accurately [67]. Such worries are common in practice and need to be answered by the policy details. According to this characteristic, we can further predict the next phase of policy initiatives may pay attention to recognizing collectives' ownership right which is vacant to a certain extent, for instance, the Opinions of the General Office of the CPC Central Committee and the General Office of the State Council on Improving the Measures for Separating Rural Land Ownership from Contracted Management Right issued in 2016 re-emphasized the rural land institutional baseline of collective ownership, proposed to recognize collectives' ownership right, revealed the policy would like to change the empty shell nature of the role of the collective by endowing it with some more practical functions.

The Peasants' Households have played an active role during the institutional reform. Actually, since the 1980s, farmland transfer has been encouraged by legislation such as the Land Administration Law and Rural Land Contract Law, farmland transfer practices also have occurred in the past few decades, since farmers can no longer rely on small-sized farmland for a continuous income stream [12]. It was the land contractual operation right that was transferred according to the provisions of these laws. However, farmland transfers were limited to the duration of the contract, Peasants' Households have to treat contracting and operation as separate in transfer practice [57]. To pursue the security of land contract rights [68], farmland transfer often occurs between relatives rather than strangers, spontaneous land transfers among farmers were expensive, short-term, and governed without formal contracts, thus land

concentration and scale were difficult [69], and transferees tend not to invest in agricultural production on cultivated land [29]. It was farmers' informal transfer practices promoted the improvement of the regulatory system, the TPRS reform, on the one hand, legalized land transfer practices that have occurred in the past few decades, on the other hand, clarified the legal relationships, rights and obligations of each participant in farmland utilization [57]. That is, Peasants' Households actively influenced the transformation from HCRS to TPRS, however, the roles of Peasants' Households changed in the second period, and their legitimate rights and interests were expanded [11] and they became passive and merely supported the implementation of policy objectives and instruments. Our findings were not entirely consistent with the existing literature. We agree with Zhang et al. [67] that Peasants' Households played active roles in the land transfer decision [67], but we also extend the analysis of Zhang et al. [67] that once Peasants' Households transferred the operation of their lands, their roles became passive and supportive. As described by Hong and Sun [9], the interests of Peasants' Households were passively influenced by the Rural Land Stock Cooperative instrument; however, the current land stock system did not allow Peasants' Households to circulate their stocks in the fair market [9]. Eventually, Peasants' Households only possessed virtual stocks and passively received the distribution of profits from Peasants' Collectives.

New Agricultural Business Entities and Professional Farmers who were considered as new actual operators of lands under the TPRS system. Our results echo the research of Cheng et al. [18] that New Agricultural Business Entities played an active role in realizing Rural Revitalization [18], they have a relatively large scale of operation, better material equipment conditions, management capacity, and rather high labor production, resource utilization and land yield [70], which can not only improve the economic welfare of farmers' families and the market-driven effect by alleviating the "lock-in effect" [18], but also have great advantages in many aspects such as the resources, economic technology. Nevertheless, Li et al. [1] expressed concern that new profit-oriented agricultural business entities could substantially increase provisioning services in the short-term but severely exploit ecosystems in the long-term [3], thus, the sustainability of farmlands should be further investigated. Compared with New Agricultural Business Entities, Professional Farmers played minor roles in the land system reform, even though the importance of training Professional Farmers has been recognized [19]; however, as shown in Section 3.1, the roles of Professional Farmers were marginalized in the web of policy keywords. The incentives for Professional Farmers to play active roles in policy implementation should be further noticed since they are more knowledgeable than Peasants' Households and may contribute more to Agriculture Modernization.

4.2. *The stabilizing incline of policy objectives*

Policy objectives are inclined to the stability of legal rights among stakeholders and the scale production of lands. Land Contracting Relationship Stable played an active role throughout the two periods. Contracted Management Right played all the active, passive, and supportive roles in the first period, and the same for Land Operation Right in the second period. Moreover, Moderate-scale Agricultural Operations were the main policy objective in the two periods, with all the active, passive, and supportive roles, and Agricultural Modernization was passive in the two periods. Our findings echoed the observation of Shang et al. [35] that establishing a Contracted Management Right could complement the Land Contracting Relationship Stable as both objectives actively shaped the implementation of other policy instruments [35]. We also extended the opinion of Shang et al. [35] that the Land Operation Right belonging to Professional Farmers and New Agricultural Business Entities were complementary to Land Contracting Relationship Stable, especially in the institution of the TPRS system. Furthermore, we responded to Xu et al. that Moderate-scale Agricultural Operations have been proposed and actively promoted by the government [71]. Along with overcoming land dispersion, Agriculture Modernization's objective could be passively achieved; however, we also found that Farmers' Income (K14) was not prioritized in the land system reform transitional processes. While Zhou et al. [72] demonstrated that land policy innovations of TPRS could alleviate rural poverty [72], our results showed that Farmers' Income did not actively shape or passively fulfilled through the implementation of other policy instruments or complementary objectives. Farmers' income in fact could be increased in the institutional transitions of land system reform rather than merely reducing poverties.

4.3. *The diversity of policy instruments*

Policy instruments intensively focused on legal regulations with little attention on financial instruments and human resources. Land Transfer and Land Transfer Contracts were the essential regulatory instruments that actively guided the implementation of other instruments through the two periods since the transfer of land rights is accomplished through signing contracts by leasing, hiring, or mortgaging to transfer entire or partial property rights among individual contracting parties [73]. For a long time, China's land transfer market was immature, and most rental transactions were between relatives and neighbors with irregular contracts, oral contracts, insufficient time limit contracts, or even no contract, which led to frequent disputes over land transfers [39] which concern the policymakers. The conversion from HCRS to TPRS promotes further improvement of the rural land market and encourages land transfer to large-scale farm households or leading agricultural enterprises to achieve long-term moderate-scale agricultural operations. However, contract instability arises endogenously when smallholders sign fixed rent contracts with large renters [58], and the risk of contract breaks is raised. Furthermore, many outside renters lack relational networks inside the village and understanding of the village, which can also increase contract instability. As a result, under the Rational Man assumption, large-scale farm households or leading agricultural enterprises are unwilling to make long-term investments in land with unstable contract relationships. Thus, the government pays much attention to regulating the land transfer contract while encouraging the separation of operation right to avoid opportunistic behavior, protect the spirit of the contract, and achieve policy objectives. Other legal instruments, including Land Registration Certification, Farmland Legal System, Rural Land Conflicts and Disputes, and Risk Prevention, served as passive or supportive roles.

Financial instruments centralized the utility of the Rural Land Stock Cooperative in the two periods complemented by Rural Financing and Agricultural Subsidies in the first and Rural Mortgage Loans in the second period. Rural Labor Migration only actively emerged in the second period. Although the reform of TPRS clarified the mortgage function of operation right at the legal level, and the operation right mortgage loan became a major innovation in the rural financial system [74]. It allows the Peasants' Households to get capital by using their owned land right property [62] so that land and capital can be freely converted. It aims to overcome insufficient credit collateral, thereby minimizing the high monitoring costs associated with reputation mechanisms [63], and active the capital role of rural land. In practice, the policy was not substantially implemented by stakeholders. According to our survey of Beijing farmers in 2019, only 5.37 % of Peasants' Households were familiar with the knowledge of Rural Mortgage Loans [15], that is, once policy instruments are issued, their effects will not emerge immediately. Furthermore, based on our results, we agreed with Shao et al. [37] and Kuang et al. [38] that Land Transfer was an essential policy instrument implemented to fulfill the institutional change in land system reform [37,38]. We also broadened the analyses of Shao et al. [37] and Kuang et al. [38], who found that the implementation of Land Transfer was launched together with other policy instruments, including legal and financial instruments. The mixed effects among different policy instruments should be further analyzed in future research. We also echoed the analysis of Hong and Sun [9] that the Rural Land Stock Cooperative was an essential financial instrument to protect the interests of Peasants' Households [9]. Nevertheless, as discussed in the previous paragraph, Peasants' Households could only passively receive the distribution of profits from Peasants' Collectives. As the objective of Farmers' Income was not currently prioritized, the influence of the Rural Land Stock Cooperative on the income of Peasants' Households should be further noticed by policies. Furthermore, the instrument of Arable Land Protection (K27) was marginalized in the web of policy keywords. We fully agreed with Zhou et al. [72] that Arable Land Protection was significant to ensure food security and sustainable development of lands [72]. Following the analysis of Zhou et al. [72], the quantity of arable land in China generally kept a balance on the whole, but the quality of arable land has sharply dropped due to the illegal use of arable lands; however, the present policy instruments did not employ sufficient penalties and governance for the illegal use of arable lands. The instrument of Arable Land Protection in practice should be extensively strengthened. In conclusion, the focus on legal regulations over financial instruments and human resources highlights a potential area for further research and policy adjustment. It points to a possibly narrow approach to policy making, and policy implementation that might not fully address all necessary aspects of sustainable development.

5. Conclusions and policy implications

5.1. Conclusions

The institutional change from HCRS to TPRS systems was a significant milestone for China to pursue long-term sustainable farmland uses and secure food production. During the transnational process, not only stakeholders in the governance of lands dramatically switched but also the settlement of policy objectives and instruments. To explore the interactions between different policy elements, this paper developed policy network models of HCRS and TPRS respectively, which contain various policy elements of policy stakeholders, objectives, and instruments. The results show that first, the dynamics of stakeholders changed with the implementation of policies in different periods. Detailly, Peasants' Households was the most active stakeholders in the HCRS period and became passive and supportive in the TPRS period. New Agricultural Business Entities replaced Peasants' Households as the most active subjects under the TPRS system. Second, policy objectives contained several interrelated purposes to establish a market mechanism that facilitated land transfers in rural areas, sustainable farmland uses, and contributions to food security in the long term. These different policy objectives were achieved through different dynamics among stakeholders and policy instruments. Third, policy instruments intensively focused on legal regulations such as Farmland Legal System and Rural Land Conflicts and Disputes, however, financial instruments and human resources instruments attracted little attention, for instance, financial instruments centralized the utility of the Rural Land Stock Cooperative in the two periods complemented by Rural Financing and Agricultural Subsidies in the first and Rural Mortgage Loans in the second period. Rural Labor Migration only actively emerged in the second period. Based on these findings, we further suggest the ideal directions for the evolution of policies in the future in section 5.2.

5.2. Policy implications

This paper treats the dynamic of farmland system not viewed as a monolith, but rather as a set of networks combined by policy stakeholders, objectives, and instruments, this approach matters in two ways, first, due to the comprehensive and systemic nature of public policy issues, policies and their implementation must include a comprehensive approach, to reveal specific policy elements and considerations that may be overlooked. Second, it helps understanding the causal impact of multiunit structures is critical to understanding policy action (and inaction), and is applicable to other policy sectors, which makes the findings more general.

We generated three further policy implications based on our findings. First, the protection for the exploitation of lands should be intensified. Currently, Peasants' Collectives with Contracted Management Rights could license Professional Farmers or New Agricultural Business Entities to operate in farmlands. Under the present institution, Peasants' Collectives could also recycle these contracts if the contracted lands were exploited; however, as we found through the webs of keywords in the first and second periods, the roles of the Peasants' Collectives were passive. Detailly, the meaning of Peasants' Collectives should be clarified at the legal level, and the exercise of ownership disposition function should be endowed with actual meaning to supervise the sustainable uses of farmlands, such as use the instrument of Arable Land Protection to recycle land operation rights (when farmland is not planted for a long time). Second, the involvement of actual operators, i.e., New Agricultural Business Entities and Professional Farmers, should also be increased and

modified. As shown in Section 3.1, Professional Farmers were marginalized in the web of policy keywords, and New Agricultural Business Entities only emerged as active stakeholders in the second period. These two stakeholders possessed higher levels of knowledge and technological capabilities than Peasants' Households. The current policy objective of Moderate-scale Agricultural Operations merely guided the two stakeholders to contribute to scale food production rather than agricultural innovation. The guidance of actual operators to be involved in agricultural innovation, such as new species of food plants and environmentally friendly fertilizers, strengthening operators' knowledge capacities, integrating agricultural manufacturing, processing, sales activities vertically, and integrating agricultural services horizontally, should be the ideal policy transition in the future. Third, decision-makers should pay more attention to the implementation of financial instruments such as Rural Mortgage Loans to promote the integration of farmland and finance. In 2015, Guiding Opinions of the State Council on Implementing the Pilot Programs of Loans with Mortgage of the Right to Contractual Operation of Rural Land and Farmers' Housing Property Rights issued the pilot trial of farmland operation right mortgages in 232 pilot areas, and some mortgage loan modes have been formed such as 'Direct Mortgage', 'Mortgage & Insurance', 'Mortgage & other Guarantee', and 'Mortgage & other Guarantee & Insurance'. However, the enactment of policy does not guarantee that it could be smoothly implemented, measures still need to be taken to promote further policy implementation, such as widely publicized related policies to stakeholders through various channels; designing more targeted and universal land mortgage financing products for financial setups; establish and improve local government guarantee systems and so on.

5.3. Limitations

This study, however, still has three limitations that future studies should overcome. First, this study applied the method of content analysis to generate empirical results, although some survey data conducted by the research team have been used to verify the results, the details still need to be improved. In the future, other comprehensive methods, such as personal interviews, or case studies may be operated to deeper understand the initiatives of stakeholders and their dynamic interactions in the policy implementation processes. Second, our analysis was limited to the central government's data in China. The research regarding the regional diversities in the land system reform in China and comparisons still need to be further explored by future studies. Third, the approach can be applicable to other policy sectors, or districts, however, the farmland system reform discussed in this paper is context-specific to China and its unique political and economic environment, which may limit the generalizability of the findings to other contexts with different land use challenges and governance structures. Therefore, further exploration and comparisons of farmland policy structures between China and other countries still need to be clarified.

Data availability statement

Data used in this article were available to all public access.

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CRedit authorship contribution statement

Yating Zhang: Writing – original draft, Methodology, Funding acquisition, Data curation. **Chung-Han Tsai:** Funding acquisition, Data curation, Conceptualization. **Chao-chen Chung:** Writing – review & editing, Methodology, Formal analysis.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests:Chao-cheun Chung reports financial support was provided by The National Social Science Fund of China.

Appendix A

List of policy texts (2004–2012)

Issued year	Articles and related policy documents	Issued year	Articles and related policy documents	Issued year	Articles and related policy documents
2004	Land Administration Law of the People's Republic of China (2004 Amendment)	2007	Report of the Fifth Session of the Tenth National People's Congress on the Implementation of the 2006 Plan for National Economic and Social	2010	Opinions of the Key Tasks of Deepening Economic System Reform in 2010

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Issued year	Articles and related policy documents	Issued year	Articles and related policy documents	Issued year	Articles and related policy documents
			Development and on the 2007 Plan for National Economic and Social Development		
2004	Law of the People's Republic of China on Promotion of Agricultural Mechanization	2007	Report on the Promotion of New Socialist Countryside Construction	2010	Decision from the CPC Central Committee and the State Council on Accelerating Water Conservancy Reform and Development(Central Committee's Document No. 1 for 2011)
2005	Law of the People's Republic of China on the Protection of Women's Rights and Interests (2005 Amendment) (Chapter V Rights and Interests Relating to Property)	2007	Opinions of the Key Tasks of Deepening Economic System Reform in 2007	2011	Opinions of Strengthening the Mediation and Arbitration Training of Rural Land Contracting Disputes
2007	Property Law of the People's Republic of China (Chapter XI Right to the Contracted Management of Land)	2007	Administrative Regulation on the Registration of Farmers' Professional Cooperatives	2011	Notice of Carrying out Inspections on the Implementation of Rural Land Contracting Laws and Policies
2009	Law of the People's Republic of China on the Contracting of Rural Land (2009 Amendment)	2007	General Framework of National Agriculture and Rural Information Construction(2007–2015)	2011	The Twelfth Five-Year Plan for National Economic and Social Development of the People's Republic of China (Part II Strengthen Agriculture and Benefit Farmers: Accelerate the Development of a New Socialist Countryside)
2009	Law of the People's Republic of China on the Mediation and Arbitration of Rural Land Contract Disputes	2007	Plan for Development of the National Rural Economic and Social Development During the 11th Five-Year Plan	2011	Opinions of Key Tasks of Deepening Economic System Reform in 2011
2010	Organic Law of the Villagers' Committees of the People's Republic of China (2010 Revision)	2007	Report of the Fifth Session of the Tenth National People's Congress on the Implementation of the 2006 Plan for National Economic and Social Development and on the 2007 Plan for National Economic and Social Development	2011	Regulation on the Protection of Basic Farmlands (2011Revision)
2012	Agriculture Law of the People's Republic of China	2007	Several Opinions of Effectively Strengthening Agricultural Infrastructure Construction and Further Promoting Agricultural Development and Increasing Farmers' Income (Central Committee's Document No. 1 for 2008)	2011	Plan for Development of the National Farmers' Education and Training During the 12th Five-Year Plan
2004	Notice of Proper Resolve the Rural Land Contract's Disputes	2008	Opinions of Do a Good Job in the Management and Service of Rural Land Contract Management Rights Transfer	2011	Urgent Notice of Prohibiting Industrial and Commercial Enterprises from Leasing Farmland and then Changing its Use for Non-Agricultural Construction without Authorization
2004	Decision of Deepen Reform and Strict Land Management	2008	Resolution of the First Session of the Eleventh National People's Congress on the Report on the Implementation of the Central and Local Budgets for 2007 and on Draft Central and Local Budgets for 2008	2011	High-Standard Basic Farmland Construction Specifications (for Trial Implementation)
2004	Notice of Resume Production on Abandoned Farmland	2008	Notice of Effectively Do a Good Job in the Current Work of Migrant Workers	2011	The Twelfth Five-Year Plan for the Economic and Social Development of the National Agricultural Reclamation
2004	Notice of Promote the Inspection Work of Basic Farmland Protection	2008	Report on the Promotion of Stable Income Growth of Farmers	2011	The Twelfth Five-Year Plan for the Development of the National Plantation Industry
2004	Opinions of Rectification of Problems in the basic agricultural land protection	2008	Opinions of Deepening Economic System Reform in 2008	2011	Notice of Accelerate the Registration and Certification of Rural Collective Land
2004	Opinions of Several Policies to Promote Farmers' Income	2008	Notice of the State Council on Issuing the Major Tasks for 2008	2011	Opinions of Create National Agricultural Industrialization Demonstration Base
2004	Opinions of Recovery and Development of Food Production	2008	Outline of Medium- and Long-term Plan for National Food Security (2008–2020)	2011	Notice of the Main Points of Rural Business Management in 2011
2004	Resolution of the Second Session of the Tenth National People's Congress on the Report on the Work of the Government	2008	Measures for Land Registration	2011	Opinions of Do a Good Job in 2011 Agricultural and Rural Economic Work

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Issued year	Articles and related policy documents	Issued year	Articles and related policy documents	Issued year	Articles and related policy documents
2004	Opinions of Several Policies to Further Strengthen Rural Work and Improve Comprehensive Agricultural Production Capacity (Central Committee's Document No. 1 for 2005)	2008	Notice of the State Council on Issuing the Outline of the National Overall Planning on Land Use (2006–2020)	2011	Several Opinions of Accelerate Agricultural Science and Technology Innovation to Continuously Enhance the Ability to Guarantee the Supply of Agricultural Products (Central Committee's Document No. 1 for 2012)
2005	Notice of Further Work to Stabilize and Improve the Relationship Between Rural Land Contracting	2008	Notice of the State Council on Promoting the Land Saving and Intensive Use	2011	Opinions of Carry Out the 2011 National Action to Stabilize and Increase Food Production
2005	Measures for the Administration of Circulation of Rural Land Contracted Management Right	2008	Several Opinions of the Central Committee of the Communist Party of China and the State Council on Promoting Stable Development of Agriculture and Sustained Income Growth of Farmers(Central Committee's Document No. 1 for 2009)	2012	Notice of Issued Pilot Programs and the Pilot List of Standardized Management and Services for Rural Land Contract Management Right Transfer
2005	Resolution of the Third Session of the 10th National People's Congress on the Implementation of the 2004 Plan for National Economic and Social Development and on the 2005 Draft Plan for National Economic and Social Development	2009	Rules on the Arbitration of Rural Land Contracting Disputes	2012	Rural Land Contract Management Rights Registration Pilot Work Protocol (for Trial Implementation)
2005	Opinions of Deepening Economic System Reform in 2005	2009	Resolution of the Second Session of the Eleventh National People's Congress on the Implementation of the 2008 Plan for National Economic and Social Development and on the 2009 Draft Plan for National Economic and Social Development	2012	Training Syllabus for Mediators and Arbitrators of Rural Land Contracting Disputes (for Trial Implementation)
2005	Notice of the Establishment of Demonstration Area for the Basic Farmland	2009	Notice of the State Council on Ratifying and Forwarding the Opinions of the National Development and Reform Commission on Deepening the Reform of Economic System 2009	2012	Resolution of the Fifth Session of the Eleventh National People's Congress on the Implementation of the 2011 Plan for National Economic and Social Development and on the 2012 Plan for National Economic and Social Development
2005	Opinions of Ministry of Land and Resources, Ministry of Agriculture, National Development and Reform Commission, Ministry of Finance, Ministry of Construction, Ministry of Water Resources, and State Forestry Bureau concerning Improving the Protection of Basic Farmland	2009	Notice of Designating Basic Farmland for Permanent Protection	2012	Report on Land Management and Mineral Resources Development and Utilization and Protection Work
2005	Opinions of Supporting and Promoting the Development of Professional Farmers' Cooperative Organizations	2009	Opinions of Establishing a National Modern Agriculture Demonstration Area	2012	Notice of the State Council on Issuing the Plan for Development of the Services Industry During the 12th Five-Year Plan
2005	Opinions of the Development of Food Production in 2005	2009	Opinions of Promoting the Innovation of Agricultural Management System and Mechanism	2012	Opinions of Implementation and Work Departments' Labor Division on the 'Government Work Report'
2005	Notice of Several Policy Opinions on Further Strengthening Rural Work and Improving Comprehensive Agricultural Production Capacity	2009	Promote the Stable Development of Agriculture, Farmers' Income Increase and the Urban-Rural Areas' Integration	2012	Opinions of the Key work of Deepening Economic System Reform in 2012
2005	Resolution of the Third Session of the Tenth National People's Congress on the Report on the Work of the Government	2009	Key Points of Agricultural Policies and Regulations in 2009	2012	Opinions of Support the Development of Agricultural Industrialization Leading Enterprises
2005	Opinions of Promoting the Construction of New Social Villages (Central Committee's Document No. 1 for 2006)	2009	Opinions of the CPC Central Committee and the State Council on Exerting Greater Efforts in the Overall Planning of Urban and Rural Development and Further Solidifying the Foundation for Agricultural and Rural Development (Central Committee's Document No. 1 for 2010)	2012	National Modern Agriculture Development Plan (2011–2015)

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Issued year	Articles and related policy documents	Issued year	Articles and related policy documents	Issued year	Articles and related policy documents
2006	Guidelines of the Eleventh Five-Year Plan for National Economic and Social Development (Part 2 Construction of New Social Villages)	2010	Opinions of Strengthening the Management of Rural Land Contract Archives	2012	Opinions of Implementation of the 'National Modern Agriculture Development Plan (2011–2015)' to Accelerate the Implementation of Modern Agriculture Construction
2006	Opinions of Deepen the Reform to Strengthen the Construction of Grass-roots Agricultural Technology Extension System	2010	Resolution of the Third Session of the Eleventh National People's Congress on the Implementation of the 2009 Plan for National Economic and Social Development and on the 2010 Draft Plan for National Economic and Social Development	2012	National Rural Economic Development '12th Five-Year' Plan
2006	Opinions of Reduce the Farmers' Burden	2010	National Major Function Area Planning (Chapter 11 Regional Policy)	2012	Opinions of Promote the Construction of Rural Management Information Technology
2006	Notice of Implementation of the CPC Central Committee and the State Council on Promoting the Construction of New Social Villages	2010	Report on National Food Security Work	2012	The Ministry of Agriculture to Implement the State Council of the Party Central Committee on the 'Three issues of Agriculture, the Countryside and Farmers' Key Work Implementation Plan
2006	Opinions of Accelerate the Development of Agricultural Industrialization	2010	Report on the Rural Labor Migration Work and Protecting the Rights and Interests of Migrant Workers	2012	Reclamation Modern Agriculture Demonstration and Upgrading Activities Program
2006	The Eleventh Five-Year Plan for the Economic and Social Development of the National Agricultural Reclamation (2006–2010)	2010	Measures for the Investigation and Handling of Disputes over Land Title	2012	Notice of the Main Points of Rural Management in 2012
2006	Opinions of the Central Government to Promote the Implementation of the Strategic Deployment of New Social Villages	2010	Notice of Improve the Management of Agricultural Land Facilities	2012	Opinions of Do a Good Job in 2012 Agricultural and Rural Economic Work
2006	Resolution of the Fourth Session of the 10th National People's Congress on the Implementation of the 2005 Plan for National Economic and Social Development and on the 2006 Draft Plan for National Economic and Social Development	2010	Opinions of strengthening the Construction of Rural Management System	2012	Notice of Enhance the Arable Land Protection Level to Comprehensively Strengthen the Construction and Management of Arable Land Quality
2006	Several Opinions of Actively Develop Modern Agriculture and Solidly Promote New Social Villages (Central Committee's Document No. 1 for 2007)	2010	Opinions of Doing a Good Job in Rural Operation and Management in 2010	2012	Several Opinions of Accelerate the Development of Modern Agriculture to Further Enhance the Vitality of Rural Development (Central Committee's Document No. 1 for 2013)

Appendix B

List of policy texts (2013–2019)

Issued year	Articles and related policy documents	Issued year	Articles and related policy documents	Issued year	Articles and related policy documents
2013	Decision of the CCCPC on Some Major Issues Concerning Comprehensively Deepening the Reform	2016	Notice on of Information Application Platform Construction of Contracted Operation Right of Rural Land	2019	Land Administration Law of the People's Republic of China
2013	Explanatory Notes for the 'Decision of the CCCPC on Some Major Issues Concerning Comprehensively Deepening the Reform'	2016	Opinions of the General Office of the CPC Central Committee and the General Office of the State Council on Improving the Measures for Separating Rural Land Ownership from Contracted Management Right	2019	Several Opinions on Giving Priority to Development of Agriculture and Rural areas and to Achieve Success in 'Agriculture, Farmer and Rural area' Work (Central Committee's Document No. 1 for 2019)
2013	Communiqué of the Third Plenary Session of the 18th Central Committee of the CPC	2016	13th Five-Year Plan(2016–2020)	2019	Opinions on Strengthening the Building of Rural Management and Administration System
2014	Several Opinions on Comprehensively Deepening Agricultural Reform to	2016	Interim Measures for the Pilot Program of the Loans Secured against the	2019	Opinions on Pertaining to Rural Work in 2019

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Issued year	Articles and related policy documents	Issued year	Articles and related policy documents	Issued year	Articles and related policy documents
	Promote Agricultural Modernization (Central Committee's Document No. 1 for 2014)		Management Right of Contracted Rural Land		
2014	Several Opinions of the General Office of the State Council on Financial Services for the Development of "Agriculture, Rural Areas and Farmers"	2016	Several Opinions of the Stepping up supply-side structural reform and Speed up Efforts to Foster New Drivers Powering Agricultural and Rural Development (Central Committee's Document No. 1 for 2017)	2019	Interim Regulation on Real Estate Registration
2014	Several Opinions on Orderly and Legal Circulation of the Right to Land Contracting Management	2017	Secure a Decisive Victory in Building a Moderately Prosperous Society in All Respects and Strive for the Great Success of Socialism with Chinese Characteristics for a New Era – Delivered at the 19th National Congress of the Communist Party of China	2019	Notice on Review work of Confirmation, Registration, and Issuance of Certificates on the Right to the Contracted Management of Rural Land
2015	Several Opinions on Confirmation, Registration, and Issuance of Certificates on the Right to the Contracted Management of Rural Land	2018	Constitution of the People's Republic of China	2019	Guiding Opinions on Coordinating and Promoting the Reform of Property Rights System for Natural Resources Assets
2015	Several Opinions on Deepening Reform and Innovation and the Acceleration of the Agricultural Modernization (Central Committee's Document No. 1 for 2015)	2018	Organic Law of the Villagers' Committees of the People's Republic of China	2019	Opinions on Establishing and Improving the Systems, Mechanisms, Policies and Schemes of Urban-rural Integration
2015	Guiding Opinions of the State Council on Implementing the Pilot Programs of Loans with Mortgage of the Right to Contractual Operation of Rural Land and Farmers' Housing Property Rights	2018	Law of the People's Republic of China on the Contracting of Rural Land(2018 Amendment)	2019	Interim Measures for Unified Recognition and Registration of Rights in Natural Resources
2015	Report on Stabilize and Improve the Relationship of Contracted Management of Rural Land	2018	Planning for the Rural Area Revitalization Strategy (2018–2022)	2019	Work Programme for Unified Recognition and Registration of Rights in Natural Resources
2015	Several Opinions of the CPC Central Committee and the State Council on the Implementation of New Concepts on the Development and the Acceleration of the Agricultural Modernization for the Realization of the Moderate Prosperity in All Respects (Central Committee's Document No. 1 for 2016)	2018	Report of the State Council on Implementing the Pilot Programs of Loans with Mortgage of the Right to Contractual Operation of Rural Land and Farmers' Housing Property Rights	2019	Decision of the Central Committee of the Communist Party of China on Major Issues Concerning Upholding and Improving Socialism with Chinese Characteristics and Modernizing the State Governance System and Capacity – Deliberated and Adopted at the Fourth Plenary Session of the 19th Central Committee of the CPC
2016	Notice of the Ministry of Agriculture on Issuing the Rules for the Operation of the Circulation and Trading Markets of the Right to Manage Rural Land (for Trial Implementation)	2018	Opinions on the Implementation of the Rural Area Revitalization Strategy (Central Committee's Document No. 1 for 2018)	2019	Opinions of the CPC Central Committee and the State Council on Keeping the Land Contracting Relationship Stable and Unchanged on a Long-term Basis

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